PROFILE OF

PANTEX PLANT

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Office of Oversight
Environment, Safety and Health
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FOREWORD

Site profiles provide senior Office of Environment, Safety and Health managers with relevant and current site environment, safety, and health performance information as well as communicating to Department of Energy line management the Office of Oversight's concerns and understanding of site conditions. Site profiles are a key management tool used by the Office of Oversight to focus and prioritize independent oversight evaluation activities and to optimize the allocation of Oversight resources. The Office of Oversight maintains site profiles on 20 major Department of Energy sites, and normally updates each profile semiannually through a process of soliciting Department of Energy line management review and comment on the revised site profile information. Upon resolution of any line management comments, the profile is considered validated and is disseminated.

Site profiles are developed using an institutionalized process of collecting data from multiple sources, and then collating, synthesizing, and analyzing this information to develop a balanced evaluation of environment, safety, and health performance at the site. The data that forms the basis of a site profile comes from sources both internal and external to the Department of Energy. Office of Oversight appraisal activities provide an important source of data. Data is also collected and synthesized from such sources as the Defense Nuclear Facilities Safety Board, the General Accounting Office, state regulators, and Department of Energy line management organizations. This information is reported in a format designed to highlight essential missions, performance, significant issues, and operational data at a management level. The process involves additional field verification of initial conclusions to confirm the validity and significance of the information. All Oversight offices participate in the collection, analysis, interpretation, and validation of site profile information.

As the site profile process matures, the Office of Oversight plans to incorporate additional information into the documents, including a presentation of quantitative measures and trends in environmental, safety, and health performance, and a description of safeguards and security activities, performance, and issues.

PROFILE OF

PANTEX PLANT

OVERVIEW

SITE CHARACTERISTICS

Site characteristics include information on site size and location, mission, organizations, contractual status, and major initiatives and activities.

Additional information on site characteristics is provided in Section 1.0, starting on page 1.

Date Established: 1951

Present Mission:

The mission at Pantex is changing emphasis from nuclear weapons assembly to weapons disassembly and interim storage of plutonium pits.

Pantex Plant's primary mission is to:

- Assemble nuclear weapons for the nation's stockpile
- Disassemble nuclear weapons being retired from the stockpile
- Evaluate, repair, and retrofit nuclear weapons in the stockpile
- Demilitarize and sanitize components from dismantled nuclear weapons
- Provide interim storage for plutonium pits from dismantled nuclear weapons
- Develop, fabricate, and test chemical explosives and explosive components for nuclear weapons and to support Department of Energy (DOE) initiatives.

Size: 16,000 acres (25 square miles)

Pantex has undergone recent reductions in force.

Employees: 3,850 DOE, Corps of Engineers, and contractor personnel (as of August 1995).

Annual Budget: $294 million for fiscal year 1995, of which $230 million is operating funds, $38 million is for environmental restoration and waste management, and $26.3 million is for capital projects.

Cognizant Secretarial Officers: Assistant Secretary for Defense Programs (DP) and Assistant Secretary for Environmental Management (EM).

Responsible Operations/Area Office: DOE Albuquerque Operations Office (AL) and Amarillo Area Office (AAO).

Management and Operating Contractor:
Mason & Hanger - Silas Mason Co, Inc.

Subcontractors:
Battelle Memorial Institute
Sandia National Laboratory

Fissile Material: Total quantity of plutonium is 66.1 metric tons, including DOD quantities (February 6, 1996).

Significant Commitments to Stakeholders: In August 1990, DOE entered into a five-year Agreement in Principle (AIP) with the State of Texas. Negotiations to extend the AIP for another five years began in December 1994. The AIP focuses on waste management, emergency response, and environmental monitoring. Four state agencies are involved: the Governor's Office, the Texas Natural Resources Conservation Commission, the Texas Department of Public Safety Division of Emergency Management, and the Texas Department of Health - Bureau of Radiation Control.

Unions: Metal Trades Council of Amarillo Area, which consists of 12 local unions:

Thirteen unions are represented at Pantex.

- International Association of Machinists
- Boilermakers Union
- Hotel/Restaurant Union
- Carpenters Local
- International Brotherhood of Electrical Workers
- International Association of Fire Fighters
- International Union of Operating Engineers
- Painters Local
- Pipefitters Local
- Molders Union
- Sheetmetal Local
- Office and Professional Employees International Union

Also, International Guard Union of America Local 38

Major Site Activities:

Field investigations have been initiated at 13 of the 14 Solid Waste Management Units.

Mason & Hanger has developed a strategic action plan to reduce the current Pantex facility footprint.

AAO and the Federal Aviation Administration's (FAA's) Southwest Regional Headquarters signed and are implementing a memorandum of understanding (MOU) on reduction of overflights.
The following construction projects are in progress: High Explosives (HE) Synthesis Facility, Building 11-55; Special Nuclear Material

(SNM) Staging Facility, Building 12-116; Central Fire Station and Emergency Operations Center; security upgrade project, which includes electronic enhancements; and Fire Protection System Upgrade Project.

ENVIRONMENT, SAFETY, AND HEALTH (ES&H) ISSUES

A sitewide issue is an issue present at multiple facilities or within ES&H programs that impact sitewide operations. A facility-specific issue is limited to a particular facility or building.

Additional information on sitewide issues is provided in Section 3.0, starting on page 7.

Sitewide Issue 1: Handling and storage of plutonium pits from nuclear weapons presents several ES&H vulnerabilities.

Sitewide Issue 2: Action is needed on the line item for security upgrade.

There are two sitewide issues at Pantex.

KEY FACILITIES

A key facility is a facility or building that is significant from an environment, safety, and health perspective. At some sites, a key facility can be a group of facilities with similar missions, activities, hazards, or vulnerabilities.

Additional information on key facilities is provided in Section 4.0, starting on page 9.

There are 12 key facilities at Pantex.

Nuclear Explosive Bays - Weapons assembly, disassembly, examination, and testing, as well as packaging and staging of component parts.

Nuclear Explosive Cells - Weapons assembly, disassembly, examination, and testing, as well as packaging and staging of component parts.

Nuclear Explosive Special Purpose - Testing for nuclear weapons that contain special nuclear material.

Nuclear Staging Facilities/Zone 12 - Temporary staging for nuclear weapons components that contain special nuclear material.

Nuclear Staging Facilities/Zone 4 - Staging or interim storage area for weapons, weapons components, and other process-related material.

Explosives Development - Developing and testing new high explosives and examining morphology of bulk formulated explosives.

Explosives Manufacturing - Formulating, pressing, machining, gauging, and staging a variety of high explosives.

Explosives Staging - Storage and staging of all types of high explosives and insensitive high explosives.

Testing and Evaluation - Testing and evaluation of high explosives and insensitive high explosives, and nondestrutive evaluation of explosives.

Explosives Disposal - Thermal disposal of high explosives and cleaning and decontamination of tools exposed to high explosives.

Onsite Transportation and Loading Docks - Transporting nuclear explosives, weapons components, and other process-related material.

Acid/Flammable Liquid Storage - Storage for acid and flammable liquids.

SITE PERFORMANCE

Site performance is based on an analysis of available data on facilities and programs. This includes information from Office of Oversight activities, augmented by valid and relevant external and internal sources. Site performance is evaluated in terms of three of the guiding principles for safety management.

Additional information on site performance is provided in Section 2.0, starting on page 4.

Overall Safety Management Program - NOT EVALUATED

Principle #1 - Line Management Responsibility - NOT EVALUATED

Line management accepts responsibility for ES&H programs.

Facility Representatives and Subject Matter Experts ensure resolution of corrective actions.

Line management involvement in radiological protection activities increasing.

Principle #2 - Comprehensive Requirements - NOT EVALUATED

ES&H program requirements generally defined and documented.

Improving conduct of operations a priority.

Principle #3 - Competence of Personnel - NOT EVALUATED

Not evaluated.

PERFORMANCE MEASURES

Performance measures are quantitative and qualitative indications of ES&H performance taken from such sources as the Occurrence Reporting and Processing System and the Computerized Accident/Incident Reporting System, as well as contractually mandated indicators of performance.

To be provided in future versions of the site profile.

Additional information on performance measures will be provided in Section 5.0 of future versions of the site profile.

Figure 1. Pantex Site Map

SITE PROFILE -- PANTEX PLANT

1.0 SITE CHARACTERISTICS

1.1 SITE LOCATION AND SIZE

Pantex Plant is located in the Texas Panhandle in Carson County along U.S. Highway 60, about 17 miles northeast of downtown Amarillo. The Pantex Plant facility consists of 10,177 acres owned by DOE, including 9,100 acres in the main Plant area and 1,077 acres around Pantex Lake, approximately 2.4 miles northeast of the main Plant area. An additional 5,800 acres of land south of the main Plant area is leased from Texas Tech University for use as a safety and security buffer zone.

1.2 SITE MISSION

Pantex Plant was first used by the U.S. Army for production of conventional ordnance from 1942 to 1945. In 1951, the Atomic Energy Commission chose the site for expansion of its nuclear weapons assembly facilities, and the Army Ordnance Corps contracted with Silas Mason Company to begin rehabilitating portions of the original Plant and constructing new facilities. Since then, DOE and its predecessor agencies have been responsible for operation of the Pantex Plant.

The Plant missions are the fabrication of chemical explosives for nuclear weapons, assembly of nuclear weapons for the nation's stockpile, maintenance and evaluation of nuclear weapons in the stockpile, disassembly of nuclear weapons being retired from the stockpile, demilitarization and sanitization of weapon components from dismantlement activities, and interim storage of plutonium components from retired weapons. Weapons assembly, disassembly, and stockpile surveillance activities involve short-term handling (but not processing) of uranium, plutonium, and tritium, as well as a variety of non-radioactive hazardous or toxic chemicals. Environmental restoration of site facilities is a recent addition to the mission at the Plant.

Pantex is composed of several functional areas, commonly referred to as numbered zones. These zones include a weapons assembly/disassembly area (Zone 12), a weapons staging area (Zone 4), an area for experimental explosive development (Zone 11), a drinking water treatment plant (Zone 15), a sanitary wastewater treatment facility (WWTF) (Zone 13), and vehicle maintenance and administrative areas (Zone 16). Other functional areas include an explosive test-firing facility, a burning ground for explosive materials, and an area of landfills north of Zone 10; Zone 10 is currently used only for storage. Overall, there are more than 400 buildings at the Plant.

1.3 SITE ORGANIZATIONS AND CONTRACT STATUS

Site Organizations

Pantex Plant is a government-owned, contractor-operated facility managed by the DOE Amarillo Area Office (AAO). Mason & Hanger - Silas Mason Co., Inc. has been the operating contractor since 1956. Battelle Memorial Institute provides environment, safety, and health (ES&H) support to Mason & Hanger under a subcontract.

Approximately 3,500 people are employed at Pantex Plant. This number includes 90 AAO personnel, 2,970 Mason & Hanger and 370 Battelle Memorial Institute employees, 13 DOE Transportation Safeguards Division employees, 22 U.S. Army Corps of Engineers employees, and 16 Sandia National Laboratory employees. There are also approximately 250 personnel located on site associated with consultants, outside contractors, and oversight agencies.

The lead cognizant secretarial officer (CSO) is the Assistant Secretary for Defense Programs. The Assistant Secretary for Environmental Management is responsible for environmental restoration and waste management activities at Pantex.

Contract Status

The contract with Mason & Hanger expires on September 30, 1996. DOE has not yet determined whether the contract should be extended or competed. Since 1991, ES&H programs have been subcontracted to Battelle Memorial Institute. The Battelle contract expires at the same time as the Mason & Hanger contract. This contract is a cost plus award fee type contract with additional incentives for certain specific performance areas.

1.4 MAJOR SITE INITIATIVES/ACTIVITIES

Waste Management

Sanitary wastewater generated at Pantex Plant is routed through a sewer system to a WWTF in Zone 13. The present WWTF came into service in 1988, replacing an older facility built in 1942. Effluent from the WWTF is discharged to Playa #1. Two explosive processing operations discharge wastewater, which is first processed through particulate filters and activated carbon filters to remove residual explosive material, into ditches that drain into onsite playas.

The Burning Ground is used for processing explosives, explosive components, and explosive-contaminated materials and waste by means of controlled open burning. Until 1980, waste solvents were disposed of in a chemical burn pit at the Burning Ground. From 1980 to 1989, such solvents were placed in open metal tanks at the Burning Ground and allowed to evaporate. Currently, these chemicals are sent off site for disposal in accordance with applicable regulations at a permitted disposal facility.

To minimize potential exposures to workers and the environment and to reduce facility and personnel resource requirements, Mason & Hanger is developing a strategic action plan addressing management of hazardous materials inventories. The goals of the strategic action plan are to:

- Reduce storage/staging cycle times for components from dismantlement and for waste streams

- Streamline demilitarization and sanitization processes

- Reduce all hazardous material inventories.

The land disposal area, north of Zone 10, is divided into two landfill sites, one of which is currently used for Class 3 nonhazardous wastes (primarily construction debris). Before 1989, the Plant's domestic solid waste was sent to one onsite sanitary landfill for disposal. Since late 1989, such waste has been processed to remove recyclable materials, after which the nonrecyclable component is sent to an off site landfill for burial. Current practices preclude disposal of hazardous materials in onsite landfills; therefore, hazardous materials are transported offsite for disposal in accordance with applicable regulations.

Environmental Restoration

The Environmental Protection Agency (EPA), through the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), has determined that Pantex Plant is a "Superfund Site" and added it to the National Priorities List in May 1994. External oversight of the Pantex Plant is performed by the State of Texas through an Agreement in Principle (AIP) grant from DOE through the Texas National Resource Conservation Commission (TNRCC). The EPA and TNRCC have identified 14 Solid Waste Management Units (SWMUs). Work plans for all remedial investigations have been approved by TNRCC. Field investigations have been initiated at 13 of the 14 SWMUs. An initial review of the current data by TNRCC indicates that most sites can be remediated. The Pantex Plant Environmental Restoration Facility Action Plan establishes aggressive remediation schedules, with a goal of initiating remediation of all SWMUs by the year 2000 to meet the State's "Clean Texas 2000" initiative.

Decontamination and Decommissioning

Currently, no buildings at Pantex are undergoing decontamination and decommissioning (D&D).

Programmatic Activities

Two major programmatic activities include consolidation of operations and reduction of overflights.

Mason & Hanger has developed a strategic action plan to reduce the current Pantex facility "footprint" (or aerial extent of the operation). The goals of this plan are to:

- Move operations and equipment out of World War II vintage facilities

- Clearly define the future use of Buildings 11-50, 11-55, 12-116, and 12-121

- Accelerate preparations for readiness reviews of new facilities

- Consolidate nuclear operations into Zone 12 South to reduce safeguards and security requirements.

The Amarillo International Airport lies eight to ten miles southwest of the Pantex Plant. Because the airport's main runway is oriented to face into the prevailing winds, aircraft approaching or departing the airport are often routed over the Pantex Plant. In December 1994, the Federal Aviation Administration's (FAA's) Southwest Regional Headquarters and AAO signed and implemented a memorandum of understanding (MOU) on reduction of overflights. The MOU includes:

- Establishment of a DOE-FAA Hotline to alert either agency of an emergency

- Modified vectoring of aircraft (at controller's discretion) to preclude extended flying over Plant boundaries and to reduce the number of aircraft turning onto the Runway 22 final approach course over the plant

- Offering alternative sites for holding pattern practice away from the Plant.

The FAA has developed and flight tested a Global Positioning System (GPS) non-precision approach to Runway 22 at Amarillo. The new approach will be published and implemented by mid-1995.

Backcourse Localizer Approach to Runway 22 will be replaced with an Offset Localizer Approach. By angling the new approach (slightly) to the runway, aircraft paths will be moved away from nuclear material storage areas at the Plant.

A GPS ground differential station will be built at the airport by July 1997 to permit upgrading the GPS approach to include glideslope information. This will encourage aircraft equipped with new GPS navigation systems to use the approach paths that avoid overflights of the Plant.

The navigation beacon (called a VORTAC) will be moved from its present position midway between the airfield and the Plant to a position near the airport by December 1998. This will permit moving airways that currently pass over or near the Plant to locations two to four miles farther away.

Construction Activities

The following construction projects are in progress:

- High Explosives (HE) Synthesis Facility Building 11-55
- Special Nuclear Material (SNM) Staging Facility, Building 12-116
- Central Fire Station and Emergency Operations Center
- Security upgrade project, which includes electronic enhancements
- Fire protection system upgrade project.

2.0 SITE PERFORMANCE

2.1 CONCEPTUAL BASIS FOR EVALUATION

The essential characteristic of successful programs and projects is the recognition and understanding of the need for an effective management system that ensures adequate control over all aspects of the program or project. In 1994, the Secretary of Energy forwarded to Congress and the Defense Nuclear Facilities Safety Board the principles and criteria that the Department deemed necessary for an effective safety management program. These principles include:

- Principle #1: Line managers are responsible and accountable for safety.
- Principle #2: Comprehensive requirements exist, are executed, and are appropriate.
- Principle #3: Competence is commensurate with responsibilities.

2.2 SAFETY MANAGEMENT PROGRAM IMPLEMENTATION OF THE GUIDING PRINCIPLES

This interim evaluation was developed using the results of surveillances performed by the Office of EH Residents and other Office of Oversight data sources. The absence of an independent oversight evaluation at Pantex suggests that the information presented should not necessarily be considered representative of overall ES&H performance across Pantex, but rather limited to an indication of the ES&H performance of the program and/or facility identified. Where sufficient information was not available to make a comprehensive assessment of either the implementation of a guiding principle (Section 2.2) or an implementing program (Section 2.3), a limited evaluation or specific example of performance based on the best available information is provided.

Principle #1 - Line Management Responsibility for Safety

Line management has generally accepted responsibility for oversight of ES&H programs. The AAO Facility Representatives are usually effective in ensuring that corrective actions are timely and completed properly. Although AAO was not adequately involved in assuring quality of the radiological protection program in 1994, there are indications that the level of AAO involvement is improving. Further information can be found in the report *Independent Oversight Assessment of Radiological Protection Programs within the Department of Energy* (April 1995). Detailed examples taken from EH Resident surveillances and a recent special study include the following:

- DOE line organization direction is necessary to correct programmatic deficiencies in the control of radioactive and potentially contaminated materials.

- AAO has not performed a formal surveillance of the Mason & Hanger process for planning radiological work.

- In response to a hydrostatic test in which three Corps of Engineers employees were hit with water from a failed flange, the AAO investigation and followup were effective.

- After uncovering corroded tote boxes previously found in a storage magazine, the AAO Facility Representative ensured that corrective actions were complete and performed properly.

- AAO Facility Representatives have not been approving changes in the schedule for completion of occurrence report corrective actions. (See *Independent Oversight Special Study of Occurrence Reporting Systems within the Department of Energy,* November 1995.)

Principle #2 - Comprehensive Requirements

While ES&H program requirements are generally defined and documented, their implementation is not always effective. Improving conduct of operations has been a priority of AAO and contractor management. An adequate and improving radiological protection program has been established (see Section 2.3, Worker Safety and Health Programs).

Principle #3 - Competence Commensurate with Responsibilities

Not evaluated.

2.3 IMPLEMENTING PROGRAMS

Environmental Protection Program

Not evaluated.

Nuclear Safety Program

Not evaluated.

Worker Safety and Health Program

The contractor has established an adequate and improving radiation protection program for handling and storage of radioactive materials; however, the lockout/tagout program needs improvement. Deficiencies in the radiation protection program are related to use of protective equipment, control of radioactive material, and integration of radiological engineering and radiological protection early in the work planning process. Further information can be found in the report *Independent Oversight Assessment of Radiological Protection Programs within the Department of Energy* (April 1995). Detailed examples taken from EH Resident surveillances include the following:

- Mason & Hanger did not have a formal engineering and design process that effectively incorporates radiological controls. The Mason & Hanger process relies on procedural controls near the end of the planning process to mitigate risks rather than using engineering controls to mitigate risks early in the process.

- The Pantex Plant Radiological Control Manual did not include a threshold level for estimated collective radiation dose that could require a formal radiological review of nonroutine or complex work activities.

- Lockout/tagout tags at the Zone 13 North Electrical Substation did not comply with the Plant standard (STD-3118).

Facility Safety Program

A satisfactory process for occurrence reporting has been implemented and can be attributed to increased attention to conduct of operations. (See the report *Independent Oversight Special Study of Occurrence Reporting Systems within the Department of Energy*, November 1995.) The authorization basis for some facilities is not adequate. Pantex is operating under an approved Basis for Interim Operation (BIO) and Safety Systems Manual. Improving conduct of operations has been a priority of AAO and contractor management. Action plans addressing deficiencies are under development and scheduled for completion by December 1995. Pantex has resolved procedural deficiencies related to onsite transfer of radioactive and potentially contaminated material. Deficiencies in the operational readiness review program related to evaluation of the contractor's readiness review activities and specificity of readiness review criteria were addressed. Detailed examples taken from EH Resident surveillance include the following:

- In response to an increased number of occurrences, the contractor is taking action to improve the efficiency in meeting the time limits for reporting occurrences.

- The increase in occurrence reporting is attributed to an increased emphasis on conduct of operations by AAO and the contractor.

- Since DOE Order 5480.23 was issued in April 1992, only two of the required nine Safety Analysis Reports had been completed and approved by DOE (as of December 1995).

- AAO requested Mason & Hanger to review the Pantex steam system configuration, administrative policies, and procedures for deficiencies similar to those found in the investigation of a Savannah River water hammer event. The assessment report, issued in June 1995, identified the following: (1) Procedures for maintaining safe operations are general in nature; true as-built drawings along with consistent component labeling must exist for specific operating procedures to be developed; (2) Basic design of the trench and pit areas of the distribution system lend themselves to a higher potential for catastrophic failure from water hammer due to the inability to adequately drain and maintain these sections of piping; therefore, total elimination of a water hammer condition cannot be ensured due to the system design; (3) Maintenance and utilities programs do not provide for system configuration control and operability due to the "balance of plant" designation of this system.

- Contrary to AAO Procedure 115.1.0, the Readiness Validation Plan for W55 disassembly operations did not include evaluation of the contractor's readiness review.

- Contrary to AAO Procedure 115.1.1, the W55 Readiness Evaluation Plan did not include a review of the contractor's criteria and prerequisites for readiness.

- The W55 Readiness Validation Plan did not include Criteria Review and Approach Documents (CRADs) or require use of CRADs developed by the contractor. Some readiness review criteria were so general that without a defined review approach there was no assurance that the review would be adequate.

- The AAO readiness review procedure did not reference DOE STD-3006-93 and did

not clearly define the validation process or its relationship to the contractor's readiness review process. DOE-STD-3006-93 provides guidance on planning and conduct of operational readiness reviews.

3.0 SITEWIDE ES&H ISSUES

3.1 ISSUE DESCRIPTIONS

Sitewide Issue 1: Plutonium Pits

Almost all plutonium at Pantex is weapons grade and in the form of pits, plutonium assemblies that serve as a primary nuclear component of a weapon. A pit consists of a plutonium metal shell surrounded by a hermetically sealed outer metal shell that is usually stainless steel. For interim storage, pits are packaged in AL-R8 storage containers. The total quantity of plutonium at Pantex is large; the mass is classified. In July 1994, Pantex had over 6,000 pits and sealed sources.

A significant vulnerability at Pantex is total reliance on the outer metal shell of a pit as the only barrier to prevent plutonium oxidation and release. The pits have not been tested and qualified for extended storage, which begins after the service life of a weapon. Some pits have weaknesses in joint materials and design, making them vulnerable to failure and consequent plutonium release during handling and storage.

The oldest pits at Pantex are over 33 years old. Aging and environmental effects may cause or contribute to a wide variety of pit failures. Daily warming and nightly cooling of pit storage magazines may lead to crack initiation and growth in aluminum welds in some pits. Chemical contaminants introduced during testing, cleaning, and packaging may also initiate crack growth over extended periods of time.

Almost all pits are stored in magazines in AL-R8 containers. Being unsealed, the AL-R8 containers do not keep out airborne contaminants and would not completely contain plutonium released from a failed pit.

The Pantex surveillance program uses relatively simple methods to identify failed pits but does not address underlying failure mechanisms or their causes. Pantex has only one glovebox to handle failed components with exposed plutonium. It is used for contamination control and component repackaging. Normal Pantex operations involve only sealed forms of plutonium. Any incident exposing plutonium at Pantex would be handled as an abnormal event by trained personnel.

Sitewide Issue 2: Security Upgrades

Action is needed on the line item upgrade for security. The March 1995 Security Evaluations Inspection conducted by EH-21 identified several concerns, including a 1988 safeguards and security upgrade line item. Completion of the line item will resolve most of the deficiencies; however, the project is not scheduled to be completed until late 1997.

3.2 SITEWIDE ISSUE STATUS

Table 1 characterizes sitewide issues in terms of an issue statement, primary concerns, site activities, and a progress evaluation.

Table 1. Sitewide Issues

ISSUE	PRIMARY CONCERNS	SITE ACTIVITIES	PI
1. Handling and storage of plutonium pits from nuclear weapons presents several ES&H vulnerabilities.	A significant vulnerability at Pantex is total reliance on outer metal shell of a pit as the only barrier to prevent plutonium oxidation and releases. The pits have not been tested and qualified for extended storage. Aging and environmental effects may cause or contribute to wide variety of pit failures.	Pantex prepared a detailed corrective action plan to address six vulnerabilities and other issues identified by the Plutonium Vulnerability Assessment. A monthly status report is issued, discussing progress.	Fu co se as Re Pit co me De Tra co the rep
2. Action is needed on the line item for security upgrade.	Impacts from aging equipment.	Design engineers expect to complete the project on time, assuming that budget requirements met.	Fu de 19

4.0 KEY FACILITIES

4.1 FACILITY MISSION

Nuclear Explosive Bays

Buildings 12-64, 12-84, 12-99 and 12-104 are part of the production area of Zone 12 and are located inside the material access area (MAA). These buildings provide bays for weapons assembly, disassembly, examination, testing, training, process demonstration, nuclear explosive safety studies, procedure verification and similar operations, and packaging and staging of component parts. The bays in these buildings were designed as nuclear explosive facilities with the capability to process encased explosive components that contain plutonium and other hazardous materials.

The bays range in age from 7 to 25 years. Buildings 12-64, 12-84, 12-99, and 12-104 contain 62 bays. All but three bays are used for assembly or disassembly. Two bays in Building 12-84 are used for radiography operations; one bay in Building 12-104 is a vacuum chamber bay. The 62 bays total approximately 300,000 square feet. Essential safety systems include the structure's blast design, the structure (concrete walls and earth overburden), blast doors, and fire suppression system.

The major operations conducted in the assembly/disassembly bays are the partial assembly/disassembly of nuclear weapons containing HE and the complete assembly/disassembly of weapons containing insensitive high explosives (IHE). Operations on encased components rely on the casing to provide the primary containment; operations involving unencased HE are not allowed in bays that contain plutonium, but are allowed in bays that do not contain plutonium. Final disassembly of primary subassemblies involving plutonium and unencased HE is only permitted in assembly/disassembly cell facilities. Bays 1, 2, 3, and 4 of Building 12-64 are used for the testing and staging of tritium reservoirs.

Nuclear Explosive Cells

Buildings 12-44 (Cells 1 to 6), 12-85, 12-96, and 12-98 (Cells 1 through 4) are part of the production area of Zone 12 and are located inside the MAA. These buildings, totaling 73,000 square feet, provide cells for weapons assembly, disassembly, examination, training, process demonstration, nuclear explosive safety studies, procedure verification and similar operations, packaging, staging, and testing. The cells range in age from 9 to 35 years. Essential safety systems include the blast valves, blast door interlocks, and facility structure (concrete walls and slab, blast doors, and earth overburden).

Nuclear Explosive Special Purpose

Buildings 12-26 (Bays 27 and 28), 12-41, 12-50, 12-60, and 12-94 are part of the production area of Zone 12 and are located inside the MAA. These buildings provide testing/support facilities for nuclear weapons and weapon components that contain SNM. The buildings range in age from 3 to 51 years and total approximately 95,000 square feet in area. Essential safety systems include the fire suppression system (all buildings), facility structure and blast design (Buildings 12-50, 12-60, 12-94, and 12-104), and environmental chamber air temperature control primary interrupts (Building 12-94).

Except for Building 12-26, these facilities were constructed for nuclear weapons work. Building 12-26 was constructed in 1944 for munitions work as part of the World War II construction of the Pantex Army Ordnance Plant. It was originally used for shipping and staging ordnance, but is now used for component accelerated aging, tritium reservoir testing and inspecting, weapons vacuum and leak testing, and tool storage. The facility was used for assembly and disassembly of nuclear explosive-like assemblies (NELA) and war reserves (WR) units as late as the early 1980s. A NELA is an assembly that represents a weaponized nuclear explosive such as a warhead, bomb, reentry vehicle, or artillery shell. This assembly does not contain

an arrangement of HE and fissile material capable of producing a nuclear detonation.

Presently, the prime function of the facility is to provide space for tooling storage. Other significant operational areas include the Weapon Vacuum and Leak Test Bays, the Component Accelerated Aging Bays, the Tritium Reservoir Testing and Inspecting Bay, and the Pit Vault for SNM.

Building 12-41 is a weapons paint facility. It is used primarily to support painting buildings operations on Joint Test Assemblies (JTAs), weapons components (tails, fins, cases), weapon "H" Gear (containers), and roadables. Unit roadables are also repaired and modified in the building.

Building 12-50, the Separation Test Facility, is used to provide data for evaluating specific nuclear weapons release assembly hardware and installation procedures and for detecting and monitoring time and service related deterioration of the system. Selected reentry body assemblies are subjected to a functional separation test as a continuing requirement of these surveillance programs.

Building 12-60, the Mass Properties Facilities, is used to provide data for evaluating specific nuclear weapons to ensure that certain tolerance specifications for various nuclear weapons, NELAs, and subassemblies are met.

Building 12-94, the Weapons Aging Facility conducts operations consisting of exposing weapons or weapon components to variable temperature cycles for prolonged periods to simulate long term stockpile effects. The aging studies can involve complete nuclear weapons, explosives core samples, weapons components, and weapon-like assemblies.

Nuclear Staging Facilities/Zone 12 Staging

Buildings 12-26 Pit Vault, 12-42 South and North Vault, 12-44 Cell 8, and 12-58 Bays 4 and 5 are part of the production area of Zone 12 and are located inside the MAA. These buildings provide temporary staging facilities for nuclear weapon components that contain SNM. These components include pits, Oak Ridge ordnance (ORO) items, radioisotopic thermoelectric generators (RTGs), and reservoirs. These facilities range up to 51 years old and total approximately 15,000 square feet in area. Essential safety systems include the facility structure (Buildings 12-26PV, 12-42NV, 12-42SV, 12-44 Cell 8); rolling steel fire doors (Buildings 12-26PV, 12-42NV, 12-42SV); vault doors (Buildings 12-26PV, 12-42NV, 12-42SV); and fire suppression systems (Buildings 12-42SV, 12-44 Cell 8). Building 12-26 was built in 1944 as part of the World War II construction of the Pantex Plant and was originally used for shipping and staging of conventional ordnance. The other staging facilities were constructed for nuclear weapons work.

The Pit Vault is used as a staging facility for pits. Pits are encapsulated components that are packaged in specially designed containers for staging and intra-plant transport. The containers in the Pit Vault are not opened during the operations conducted within the vault. The Building 12-42 South Vault is used as a staging facility for weapon components, called "reservoirs," that are small, metal bottles filled with tritium. Reservoirs are shipped to and from the Pantex Plant in specially designed Department of Transportation certified containers. Metal cases are used for the intra-plant transport of reservoirs.

The Building 12-42 North Vault is used as a staging facility for RTGs, which are small, self-contained, sealed sources of thermally produced electricity used in several of the nuclear weapon systems. The RTGs consist of a heat source (238-Pu), a thermopile, insulator, and a container.

Building 12-44, Cell 8 is used as a temporary staging facility for pits. The primary activity conducted in Cell 8 is the automated placement and retrieval of pits in sealed containers. However, some containers are opened within the facility, and those pits

undergo a variety of inspection, testing, and verification operations. Repackaging of pits is done in Cell 8.

Bays 4 and 5 of Building 12-58 are used as staging facilities for nuclear weapons components.

Nuclear Staging Facilities/Zone 4

Modified-Richmond (M-R) magazines 4-19, 4-21, 4-25, 4-30 through 4-44, and Steel Arch Construct (SAC) magazines 4-101 through 4-142 are located in the western part of Zone 4, known as the MAA, which is approximately in the center of the Plant. The MAA is used as a staging or interim storage area for weapons, weapons components, and other process related material. These magazines were built in 1944 for storing conventional munitions. Each M-R magazine is 1,400 square feet, and each SAC magazine is 1,182 square feet. The total storage area is 71,362 square feet. Essential safety systems include the concrete security barriers, earth overburden, magazine structures (walls, roof, steel doors), and sand bag compartment barriers.
Five types of items may be placed in these magazines: weapon assemblies, pits, ORO items, RTGs, and NELAs. Weapon assemblies include any type of nuclear explosive device (warheads, bombs, reentry vehicles, or artillery shells). Weapons and pits cannot be stored together in the same magazine.

Explosive Development

Buildings 11-17, 11-22, 11-36, 11-38, 11-51, 11-55, 11-56, 12-8, 12-19, 12-59, and 12-62 are part of Pantex's explosive processing and development resources and are located in Zones 11 and 12 of the Plant. These buildings contain laboratories that have been historically used to develop and test new high explosives, examine the morphology of bulk formulated explosives, and perform routine analysis of explosives, pilot activities for new plastic bonded explosives, aging studies on various explosives, and chemical analysis of explosives and associated materials. Their primary current use is for surveillance support. The buildings range in age from 14 to 51 years.

The 11 buildings total approximately 90,500 square feet. Requirements for these facilities do not vary with production schedules, and known future missions will not change these requirements. Included are chemical laboratories, a gas analysis laboratory, a metrology laboratory, a stockpile system testing laboratory, environmental laboratories, and radiation monitoring laboratories.

Explosive Manufacturing

Buildings 11-51, 11-20, 11-50, 12-17 A&B, 12-63, 12-121, and 12-24 are used for formulating, pressing, machining, gauging and staging a variety of high explosives. These buildings range in age from 11 to 51 years and total approximately 113,450 square feet. Most of these buildings were constructed to manufacture explosives main charges and small components for nuclear weapons, and to meet the high explosives research and development mission of the site. Current missions remain the same as efforts continue to remove obsolete weapons from the stockpile. Two-thirds of these buildings were built prior to 1955. They are in poor condition, and these structures are rapidly approaching the ends of their useful lives.

Explosive Staging

Buildings 4-45 to 4-75, 11-23, 11-25, 11-37, 11-42, 11-45, 11-46, 12-55, 12-58, 12-65, 12-68B, 12-71, 12-83, 12-92, 12-95, 16-2, and 16-7A&B are used to store and stage all types of HE and IHE. These facilities will continue to be used for this purpose. These facilities range in age from 8 to 51 years and contain 46 structures covering a total area of approximately 63,300 square feet. The primary hazard in these buildings is explosives. Over 50 percent of the explosives storage facilities were constructed prior to 1950; they are in deteriorating condition and need replacement.

Testing and Evaluation

This key facility includes Buildings 11-5, 11-16, 11-18, 12-21, and 12-21A and Firing Sites FS-2, FS-3, FS-4, FS-5, FS-10, FS-11, FS-11A, FS-16, FS-18, FS-21, FS-21A, FS-22, FS-23, and FS-24. The buildings are used for testing and evaluation of both HE and IHE, test firing of explosives, and non-destructive evaluation of explosives (the firing sites are no longer being used for this purpose). The facilities range in age from 8 years to 51 years. The buildings total approximately 68,200 square feet; the Firing Sites are several square miles in size. Many of the facilities have high speed cameras to monitor and analyze tests. Missions are not expected to change until the current effort to remove obsolete weapons from the stockpile is complete in six to eight years.

Explosive Disposal

The Burning Grounds (BG-3 and BG-4) are used to thermally dispose of high explosives, and Building 12-73 is used to clean and decontaminate tooling exposed to high explosives. These facilities are between 22 and 42 years old. Building 12-73 totals approximately 1,900 square feet; the Burning Grounds are approximately one square mile in size. The Burning Grounds consist of a number of pads for open air burning supported by small material storage areas. As dismantlement continues, the need for the burning grounds to dispose of waste high explosives will also continue; eventually the need for burning of high explosives will be eliminated.

Onsite Transportation and Loading Docks

The facilities for transporting nuclear explosives, weapons components, and other process-related material consist of Loading Dock 4-26 located in the western part of Zone 4 and Loading Docks 12-98 and 12-99 in the production part of Zone 12. Operations include movement of weapons or components in safe-secure trailers or in hardened trailers between Zone 4 and Zone 12 or on forklift or handcart between buildings, and loading/unloading and packing/unpacking operations. The loading docks and transportation activities are associated with movement of nuclear weapons and weapon components.

Acid/Flammable Liquid Storage

Buildings 11-34, 11-39, and 12-34 are storage facilities for acid and flammable liquids. These facilities are between 18 and 51 years old and in need of repair. The three facilities contain approximately 1,700 square feet.

4.2 FACILITY SUMMARY

Table 2 summarizes key facility characteristics, including status, hazard classification, authorization basis, worst case design basis accident, and principal hazards and vulnerabilities.

5.0 PERFORMANCE MEASURES

This section is under development and will be presented in future versions of the site profile.

Table 2. Facility Summary

FACILITY NAME	STATUS	HAZARD CLASSIFICATION/AUTHORIZATION BASIS	WORST CASE DESIGN BASIS ACCIDENT	PRINCIPAL HAZARDS AND VULNERABILITIES
Nuclear Explosive Bays	Operational	Category II (Cat II) facilities; Authorization Basis - BIO 10/94; safety analysis report (SAR) submitted September 21, 1995; under review by DOE; 11/95 revision to BIO approved by DOE 3/96	HE explosion, plutonium dispersal. Workers in bay killed. Onsite/offsite doses included upon DOE approval of SAR meeting DOE 5480.23	High explosives, plutonium, tritium, thorium, uranium, and beryllium
Nuclear Explosive Cells	Operational	Cat II facilities; Authorization Basis - BIO 10/94; SAR scheduled for submittal to DOE for approval on December 21, 1995; 11/95 revision to BIO approved by DOE 3/96	HE explosion, plutonium dispersal. Workers in cell killed. Onsite/offsite doses included upon DOE approval of SAR meeting DOE 5480.23	High explosives, plutonium, tritium, thorium, uranium, and beryllium
Nuclear Explosive Special Purpose	Operational	Cat II facilities; Authorization Basis - BIO 10/94; SAR scheduled for submittal to DOE by January 26, 1996	HE explosion, plutonium dispersal. Workers in cell killed. Onsite/offsite doses included upon DOE approval of SAR meeting DOE 5480.23	High explosives, plutonium, tritium, thorium, uranium, and beryllium
Nuclear Staging Facilities/Zone 12 Staging	Operational	Cat II facilities; Authorization Basis - BIO 10/94; Cell S SAR approved by AAO; 11/95 revision to BIO approved by DOE 3/96	Blast driven missile penetrates 12-44 Cell 8. 6 rem Committed Effective Dose Equivalent (CEDE) at site boundary	High explosives, plutonium, and tritium
Nuclear Staging Facilities/Zone 4 Magazines	Operational	Cat II facilities; Authorization Basis - BIO 10/94; Zone 4 SAR approved; 11/95 revision to BIO approved by DOE 3/96	Forklift punctures AL-R8 container. Less than 7 rem CEDE to worker onsite	High explosives, plutonium, tritium, uranium, beryllium, and thorium
Explosives Development/ Zones 11 and 12	Operational	Low and medium (FS-3) nonnuclear hazard facilities; Authorization Basis - DOD 6055.9 STD DOD Ammunitions and Explosives Safety Standards (10/92); TM-5-1300 Structures to Resist the Effects of Accidental Explosions (11/90); Mason & Hanger prepared draft BIO; SAR scheduled to be submitted to AAO for approval by 4/15/97	Undetermined	High explosives

Table 2 (cont'd). Facility Summary

FACILITY NAME	STATUS	HAZARD CLASSIFICATION/AUTHORIZATION BASIS	WORST CASE DESIGN BASIS ACCIDENT	PRINCIPLE HAZARDS AND VULNERABILITIES
Explosives Manufacturing/ Zones 11 and 12	Operational	Low and medium nonnuclear hazard facilities; Authorization Basis - DOD 6055.9 STD DOD Ammunitions and Explosives Safety Standards (Oct 92); TM-5-1300 Structures to Resist the Effects of Accidental Explosions (Nov 90); Mason & Hanger prepared draft BIO; SAR scheduled to be submitted to AAO for approval by 7/1/97	Undetermined	High explosives
Explosive Staging/ Zones 4, 11, 12 and 16)	Operational	Low and medium nonnuclear hazard facilities; Authorization Basis - DOD 6055.9 STD DOD Ammunitions and Explosives Safety Standards (Oct 92); TM-5-1300 Structures to Resist the Effects of Accidental Explosions (Nov 90); Mason & Hanger prepared draft BIO; SAR scheduled to submitted to AAO for approval by 10/31/97	Undetermined	High explosives
Testing and Evaluation/ Zones 11, 12 and firing sites)	Operational	Low and medium nonnuclear hazard facilities; Authorization Basis - DOD 6055.9 STD DOD Ammunitions and Explosives Safety Standards (Oct 92); TM-5-1300 Structures to Resist the Effects of Accidental Explosions (Nov 90); Mason & Hanger prepared draft BIO; SAR scheduled to be submitted to AAO for approval by 7/1/98	Undetermined	High explosives and their associated chemical components
Explosive Disposal (Burning Grounds BG-3 & 4, and Bldg. 12-73)	Operational	Low hazard nonnuclear facilities; Authorization Basis - DOD 6055.9 STD DOD Ammunitions and Explosives Safety Standards (Oct 92); TM-5-1300 Structures to Resist the Effects of Accidental Explosions (Nov 90); Mason & Hanger prepared draft BIO; SAR scheduled to be submitted to AAO for approval by 8/1/98	Undetermined	High explosives and their associated chemical components; airborne particulates
Onsite Transportation and Loading Docks	Operational	Cat II facilities; Authorization Basis - BIO 6/95; SAR scheduled to be submitted to AAO for approval by 9/28/95	Undetermined	Plutonium (encased), explosives and other hazardous materials
Acid/Flammable Liquid Storage (Bldgs. 11-34, 11-39, 12-34)	Operational	Category not assigned; Authorization Basis - Draft General Information Document (GID) approved	Accident/analysis under review	Acids and flammable liquids